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THE BENEVOLENT HEGEMON

THE UNITED STATES NATIONAL SPACE PROTECTION STRATEGY – ANCHORED IN COOPERATION NOT TECHNOLOGY

By

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Abstract

Space capabilities contribute significantly to all aspects of our daily lives, from multi-national banking and urban planning, to worldwide telecommunications and robust materials distribution operations, to tactical and strategic military applications. The data and information from space has become critical to our way of life. Specifically for the United States military, space capabilities are force multipliers to our global warfighters. Therefore, protecting these capabilities is paramount and must be a national priority with a foundation built upon international cooperation and augmented with a few critical passive protection devices.

Our national space protection strategy must not follow the historical pattern of problem solving that the United States Air Force and intelligence community have used. The United States Air Force was built upon a foundation of technology superiority. No matter what the problem, we turned to technology for the solution. While this has worked through our limited history, this reliance on technological solutions cannot be the sole influence for our space capability protection.

We must first change the lens through which we view space protection by focusing on cooperation, not technology, as our primary method of problem solving. Second, we must take the moral high ground and lead the international community in establishing peaceful rules for space operations. Finally, we must make the hard choices in our acquisition programs and focus technology development in the specific areas of passive protection devices. Our emphasis must be on cooperation and building ourselves as a benevolent hegemon in space.

INTRODUCTION

"The ultimate measure of a man is not where he stands in moments of comfort and convenience, but where he stands at times of challenge and controversy."
~ Rev. Dr. Martin Luther King, Jr. (1929-1968)

Space capabilities contribute significantly to all aspects of our daily lives, from multi-national banking and urban planning, to worldwide telecommunications and robust materials distribution operations, to tactical and strategic military applications. The data and information from space has become critical to our way of life. Specifically for the United States military, space capabilities are force multipliers to our global warfighters. Intricacies of our military operations rely on space for command and control, weather forecasts, navigation, communications, and intelligence. Therefore, protecting these capabilities is paramount and must be a national priority.

Proponents against spending limited resources on space protection argue that since United States space assets are mechanisms for data distribution, and not methods of firepower delivery, protection is unnecessary.[1] In addition, since the physical loss of a satellite does not result directly in the loss of human life, some military strategists even argue that these assets do not need focused protection either.[2] Under these arguments, the authors assume that tampering, interfering, or damaging another country's technological capabilities is not interpreted as an act of war because there are no direct kinetic or personnel losses. I disagree. If a nation sees its space capability as a military force multiplier or strategic enabler, then they may consider an act against their hardware as aggressive, even without a formidable loss. Therefore, since the United States holds its space capabilities in high regard, we must be prepared to mitigate potential threats to these capabilities and ensuring protection of our national interests.

Protecting these valuable capabilities must be a national strategic priority with a foundation built upon international cooperation and augmented with a few critical passive protection devices. To accomplish this, we must ensure our national space protection strategy does not follow the historical pattern of problem solving that the United States Air Force and intelligence community have used. We must first change the lens through which we view space protection by focusing on cooperation, not technology, as our primary method of problem solving. Second, we must take the moral high ground and lead the international community in establishing peaceful rules for space operations. Finally, we must make the hard choices in our acquisition programs and focus technology development in the specific areas of passive protection devices. Our emphasis must be on cooperation and building ourselves as a benevolent hegemon in space.

We find the nation at a pivotal crossroad. Our choices today define our future for many generations. However, before we can define our nation's future, we must understand the historical patterns of our past and the problem context we face today. This understanding explains the foundation of the current situation and helps define the framework for the future.

UNITED STATES AIR FORCE HISTORY AND CULTURAL INFLUENCES

The United States Air Force was built upon a foundation of technology superiority. No matter what the problem, we turned to technology for the solution. While this has worked through our limited history, this reliance on technological solutions cannot be the sole influence for our space capability protection. As the Chairperson of the Yorkshire Campaign for Nuclear Disarmament and the Global Network Against Weapons & Nuclear Power in Space, Dr. David Webb believes the "US military dream of space dominance appears to have its roots in a belief

that science and technology can solve all human problems. [3] This international perception is quite true and demonstrates how history has constrained the lens we use for defining the future.

The Air Force has always had the fundamental belief that the most sophisticated technology leads to battlefield success. The common phrase - "the bomber will always get through" – demonstrates this perspective well. Since modern combat first saw the use of military aircraft, we have been dedicated to the belief that "superior technology and weaponry can be the guarantor of combat success." [4] This strong focus on advancing the technological aspect of warfare is the core of how our air power leaders developed the US Air Force of today. However, this culture must change as we transition to the medium of space.

Prior to World War I, airpower supported ground troops with communications, observation, and reconnaissance.[5] At that time, technology limitations prohibited aircraft from making major impacts in combat operations. However, as the technology revolution began to emerge and as operations in France commenced, airpower's impact on warfare changed. General William "Billy" Mitchell witnessed airpower's early effectiveness in combat and believed that this awesome, new technological capability would secure quick, decisive victories. He also perceived this new technology as a possible substitute for large, cumbersome artillery.

General Mitchell's views of airpower's technological advantage framed many World War II Army Air Corps leaders, such as Generals Henry "Hap" Arnold, "Pete" Quesada, and Carl Spaatz. All three of these men pushed technology development to advance the Air Corps performance and status. As the Chief of the Air Corps, Arnold focused on developing relationships with academia and industry and improved the quality of the bomber force through technology applications. General Quesada embraced technology integration into the tactical level of battle, continually testing new hardware and developing warfare applications for it. His

enthusiasm and energetic mindset pushed his staff, and senior headquarters personnel, to view the future in terms how new technologies enhanced ground operations. Quesada recognized that without good communication systems, fighter aircraft would be limited in the quantity and quality of CAS provided.[6] General Spaatz's concern about the weather issues in Germany and its impact on bombing missions forced the Pathfinder's H2X radar improvements. This technology advancement increased the frequency of bombing operations over Germany and greatly influenced his believe that "the most critical need of the Strategic Air Forces is for more Pathfinder aircraft."[7]

Throughout World War II, technology developments expanded airpower's utility and senior military leader' views of warfare. General Henry "Hap" Arnold considered the development and use of the atomic bomb the ultimate example that technology superiority wins wars. He commented on the detonations that ended World War II saying, "we are on the threshold of a true scientific revolution in the air. The next war may be fought by jet-and rocket-propelled airborne missiles guided by men sitting in concrete emplacements."[8] This became the turning point in airpower history and helped justify an independent Air Force service in 1947.

The course had been set. The path defined. Technology innovations would shape and mold the newest United States military service. This approach and philosophy has not changed and continues today in the space domain. Only a few years after the development of the atomic bomb, the Atlas program began, with an emphasis on building the country's first intercontinental ballistic missile (ICBM).[9] General Bernard Shriever was given the challenge of building the delivery system for the "ultimate weapon". His ability to lead a team of contractors, military engineers, and acquisition professionals through this complex process was instrumental in forming the backbone of today's Air Force acquisition workforce. His leadership instilled the

confidence that solving problems required sophisticated technology. While this enthusiasm in technological solutions did lead to the development of amazing satellite capabilities such as surveillance and reconnaissance, global communications, and precision navigation and timing, it also created a mindset very focused on mathematical solutions.

These early airpower leaders set the course and defined the path of a technologically superior military fighting arm. They established the foundational culture of the Air Force we know today. In *The Masks of War,* Carl Builder captures the early foundational theories as the "three tightly linked premises of modern air strategy: 1) air power can be the decisive instrument of war, 2) the decisive use of that instrument requires air superiority, and 3) achieving air superiority requires central control of air power."[10]

It comes down not to the questions of *if* or *how* technology has influenced our warfare successes, but rather, *should* technology be our foundational influence. The growth of technology has had a profound impact on warfare in the last century. However, our past successes do not dictate similar success for the future, especially not when applying airpower achievements to the spacepower domain. Just as the senior Army Air Corps leaders challenged the Army theories of airpower during their time, we too must challenge the air and spacepower concepts of today. Technological supremacy can no longer be our measure of success. Minimizing warfare in space must be our goal, and the magnitude of international cooperation and quantity of shared space options must be our measure of success. We must find a new path forward for space protection, but first we must understand the threats we likely face and the status of our historical space defense programs.

BASIC SPACE THREATS AND APPROACHES FOR PROTECTION

The United States' reliance on space presents a unique opportunity for adversaries. Our ability to prevent, detect, and mitigate a potential attack ensures we maintain our worldwide military, economic, political, and information power. However, defining the lethality and employment methods of space threats is complex. An adversary can exploit US satellite systems through onboard spacecraft vulnerabilities and the information derived from these satellites, through the networks and communications infrastructure.[11] In general, space threats fall into four categories: (1) electronic attack against capabilities at the transmission sites, the satellites, or the user equipment; (2) physical attacks against actual spacecraft or ground stations; (3) tracking and manipulating satellite transmissions; as well as (4) the adversary's use of space for battlefield force enhancement and advanced intelligence gathering.[12] While standard electronic attack and kinetic kill methods are the most common adversary threats discussed today, the tracking and manipulation of satellites/transmissions and the adversary's use of space for their own advancement remain key threats that must be considered when building a space protection strategy.

Communication and global positioning system (GPS) jammers are prevalent in the world today. Both state and non-state actors, as well as those with and without indigenous space capabilities operate them. For this reason, they are the most likely and most prevalent threats to our space capabilities. Space-based threats, such as micro-satellites, are very possible with today's available technology, but they are much more complex and expensive, and less likely to be employed in large quantities. The continued worldwide development of laser technologies, the potential for nuclear weapons detonations in low earth orbit, and the recent testing of an anti-

satellite kinetic kill vehicle by China demonstrate the emphasis for space threats remains focused on ground-launched electronic attack and kinetic kill methods.

Designing a protection strategy that mitigates all of these possible threats is not only very difficult, but is unrealistic and uneconomical. We must focus on minimizing negative effects through passive protection devices and use enhanced situational awareness systems for warning and attribution. Creating a "weaponization war" in the space domain only encourages the escalation of pre-emptive strikes and kinetic countermeasures. The outcome leads to a more massive debris problem in space for all nations as well as a much more challenging mission for United States Space Command. Since the launch of Sputnik in 1957, the United States has maintained the Space Object Catalog, a database of all known satellites and space debris greater than approximately 10 centimeters. Currently, the Joint Space Operations Center monitors more than 19,000 space objects and provides key collision avoidance information for the world.[13] Therefore, a kinetic defense program that increases space debris is fundamentally counter-productive to a United States national space protection strategy.

THREAT DEFENSE PROGRAMS

The United States' past space protection approach is the wrong course for the future. It is not that our defense has failed but rather that we have been viewing it through a bias lens. We have stayed in our comfort zone of technology solutions, insisting that a technological advantage over the enemy ensures our security. Our emphasis should have focused on improving international cooperation and not technological advancements. This has given us years of space control spending with little to show in the area of space protection.

The August 2004 release of the "Counterspace Operations" Air Force Doctrine Document 2-2.1 was the first detailed description of the new form of United States anti-satellite and space weapons operations.[14] General John P Jumper, United States Air Force Chief of Staff at the time, presents in the document's forward: "Space superiority provides freedom to attack as well as freedom from attack…Space and air superiority are crucial first steps in any military operation."[15] The document focuses on the types of technologies that are possible for supporting the space superiority/space control missions. At the time of publication, space control was neither a new mission area, nor an area of new technology focus for the Air Force.

Funding fluctuations along with continual starting and stopping of both space acquisition programs and space technology developments are examples of how the United States tries to solve its problems in space with new technologies. It began with kinetic anti-satellite weapons, then transitioned to active laser programs, and now relies on electromagnetic interference detection. We continue hoping a novel discovery breaks through and counters the known or perceived threat of the time. This inconsistent approach continues spending our limited resources and demonstrates only marginal success.

Starting back in the 1960s, both the Soviet Union and the United States tested anti-satellite weapons during the height of the Cold War.[16] United States developments of an air-launched miniature vehicle (ALMV), launching from an F-15, that could carry heat-seeking homing devices designed to attack LEO satellites occurred between 1984-1986, with a successful test against a satellite in 1985. However, increasing costs forced the program's eventual cancellation.[17]

Then there was the Strategic Defense Initiative in 1983 that included such devices as anti-ballistic missile kinetic interceptors and laser weapons. The program's planned completion date

was in 2000 at a cost of $125B, but the diminishing Soviet threat in the early 1990s caused its cancellation.[18] In addition, several high-energy laser programs, such as the airborne chemical oxygen-iodine laser (COIL) fitted on a modified Boeing 747, the space based laser program, and the possible use of a solid-state laser for blinding or destroying satellites and intercepting missiles, were all started and subsequently cancelled or have seen drastic funding cuts in the last two decades.[19]

Despite decades of space control research and funding, only one space control capability that we can remotely call "protection," is even close to reaching initial operating capability (IOC) - the Rapid Attack Identification Detection Reporting System (RAIDRS), Block 10. RAIDRS Block 10 is finally approaching IOC with the successful completion of the Required Asset Available (RAA) milestone in early March 2010.[20] Upon fielding, RAIDRS Block 10 will be a passive monitoring system that detects electromagnetic jamming and geolocates the source of the jamming. According to Lt Col Edward Allard, the Commander of the 16th Space Control Squadron that will maintain and operate the RAIDRS Block 10 system, "It's this geolocation capability that makes RAIDRS a vital component in achieving our space wing's mantra of space superiority. When we can identify and locate the source of the interference, it allows leadership to determine the right corrective action. It's a great capability, and vital to ensuring our forces have the communications they need, when they need them." While fielding RAIDRS Block 10 is a major milestone, the procurement has taken far too long and does not adequately cover the documented space protection requirements for the decades that have been spent researching technologies.

Despite the difficulty in fielding space protection solutions, the United States National Defense Laboratories continue pursuing advanced technologies for combating space threats.

Their research, though, is without consistent strategic guidance and dependable funding. The absence of a focused protection strategy has forced the development institutions to spend a great deal of time advocating for direction and funding, generally with inconsistent support from senior leadership. This has caused a dramatic fluctuation in the quantity and quality of the technologies pursued and, unfortunately a lack of focus on the key development efforts that may truly make the most impact in passive space protection options. The Experimental Satellite System-11 (XSS-11), Operationally Responsive Space (ORS), and Joint Space Operations Center Space Situation Awareness and Response System (JSARS) technology demonstrations exhibited promise for integration into formal acquisition cycles.[21,22,23] These autonomous satellite operations, rapid reconstitution alternatives, and enhanced decision support tools present technical options for less-aggressive space protection capabilities. However, without a national strategic plan, consistent advocacy, and dependable funding, operationalizing these promising capabilities has become almost impossible.

We must change this paradigm of priority and funding inconsistency and make the difficult decisions in research and acquisition. Our focus must be on non-offensive, passive protection solutions and enhanced situational awareness. This approach responsibly executes the Department of Defense budget and augments the underlying foundation for space protection – international cooperation.

CHANGING THE PARADIGM – FOCUS ON COOPERATION NOT TECHNOLOGY

Based upon the past actions of the United States, and our multiple attempts to acquire and operationalize space control systems, it should be no surprise that the world perceives us as a dominant, technical hegemon in space, with the ability of forcefully apply military technology in

this domain. Whether or not this is our intention, it is the world's perception of us today. Therefore, it should come as no surprise that China tested an anti satellite weapon on January 11, 2007.[24] However, for some, this event came as a shock and caused a flurry of activity within the defense department and the national policy makers. While many may have thought that space remained the "sanctuary" it had been in the past, others maybe were in denial of the true technological capabilities of our adversaries. Nevertheless, for whatever the reason, the discussion of space defense is back on the table and we cannot afford to misstep. Our technological superiority paradigm of the past will not work for the future. The world dynamics have changed and we must adapt.

Our focus must shift to an emphasis on internal and international cooperation, with technology development playing a supporting role with non-threatening, passive protection capabilities. This shift will not be easy for many Americans to swallow, based on our long-standing success in technologically driven airpower, but we must adjust because of all the countries in the world today, the United States has the most to lose from a war in space.

Today, no other country is as reliant on space as we are, as a nation. Not only in the military, but in the civil and commercial sectors as well. The United States relies on space for support to all of its national instruments of power, from information and communications capabilities, to economic and financial markets, to military operations. These capabilities affect our worldwide posture and we must protect them. Michael Krepon, co-founder of the Henry L Stimson Center and strong supporter for the international peaceful use of space, testified to the House Committee on Armed Services in March 2009 stating, "It is clear that US [United States] security requires assured access to space and the proper functioning of satellites that save lives, strengthen our economy, and support national security. Without the assured use of satellites,

police, fire fighters, and first responders would be hampered; satellite phones would not work during emergencies; global financial transactions would be disrupted, and US [United States] troops in harm's way would be less able to defend themselves."[25]

However, this paradigm of United States' dominance in space is changing. It is only a matter of time until other nations have just as much at stake in space as we do. At that time, the impact of a space war, or the weaponization of space, will be equally detrimental to all. We must take the lead in creating a global effort to avoid the weaponization of space, and not foster a technology race similar to that between the United States and the Soviet Union during the Cold War. Many of the nations investing in space today are doing so as a matter of national pride and advancement, hoping to gain a better "seat" at the international table. We must understand this and approach each country with a cooperative and diplomatic attitude. We must put aside the foundational belief that the United States must "control" or "dominate" space.

Let us use China as an example. While we could approach them as a possible adversary and force a technological arms race between the two countries, that approach would be counterproductive and benefit neither side. It would cause unnecessary spending in both states and would detract from more important international issues, such as the United States' focus on the war on terrorism and China's growing concerns over national resources. The Chinese culture has a famous saying – "yù bàng xiāng zhēng, yúrén dé lì" – "when the snipe and the clam grapple, it's the fisherman that benefits."[26] Interpreted within this context it explains that if the United States and China were to start a space arms race both sides would lose in the end and another country, potentially India or Russia, will take the lead. This situation certainly does not benefit the United States.

RECOMMENDATIONS

Protecting our valuable space capabilities must be a national strategic priority with a foundation built upon international cooperation and enhanced by a few critical passive protection devices. To accomplish this, we must ensure our national space protection strategy makes several radical changes from the historical methodologies the United States Air Force and Intelligence Communities have used for solving problems. First, we must change the lens through which we view space protection and focus on cooperation, not technology, as the primary method for problem solving. Second, we must take the moral high ground and lead the international community in establishing peaceful rules for space operations. Third, we must make the hard choices in our acquisition programs and focus technology development in the specific area of passive protection devices.

Our senior space leadership is beginning to realize that changes are paramount. In an interview with Air Force Magazine in early 2009, Secretary of the Air Force Michael Donley stated, "We…need to consider ways to harden and protect the end-to-end space architecture of ground stations, satellites, and command and control links against various types of threats."[27] This is a step in the right direction, but it is not enough. Secretary Donley's emphasis on hardening and protection still places focus on the technology options. He is missing a key opportunity for building a strategic foundation of cooperation. However, several others saw an opportunity after Secretary Donley's guidance and stepped forward. General C. Robert Kehler and Mr. Scott Large (Commander, Air Force Space Command and the then Director, National Reconnaissance Office respectively) understood this lack of a comprehensive space protection approach and established the Space Protection Program in March 2008.[28] The program's mandate is to "preserve national security space efforts through an integrated strategy and to

articulate vulnerabilities, assess threat impacts, identify options, and recommend solutions leading to comprehensive space protection capabilities."[29] As Mr. Large specifically outlines in Air Force Space Command's "High Frontier," "General Kehler and I expect the current program to consolidate DoD [Department of Defense], IC [intelligence community], and other stakeholder protection programs and requirements into a central national strategy."[30]

In July 2008, the Space Protection Program, under the direction of Mr. Andrew Palowitch, sent the first Space Protection Strategy to Congress. Although the content is classified, Mr. Palowitch published a few key themes of the document in a fall edition of C2ISR Journal. The overall proposed strategy does increase the nation's focus on cooperation vice competition by increasing international "interdependence" on satellite communications and navigation capabilities.[31] This is important in the areas where robust, shared capabilities are more important globally and where these shared capabilities provide less of a military advantage in combat situations. Sacrificing the strict military advantage for increased global stability is a strong and influential approach for global asset protection.

Another alternative discussed is "defining backup approaches" that provide similar capabilities, when the primary space system is degraded or disabled.[32] Mr. Palowitch reports the overall strategy is one that preserves the space "effects," not individual space systems. "We're not trying to save satellites. We're trying to preserve our national space effects."[33] This two-pronged approach is heading in the right direction, but it will take time to implement. We must continue to keep our efforts focused on clearly defining an internal shift in our technology-driven culture, recommending/sponsoring international rules for peaceful space operations, and developing non-offensive space protection technologies.

INTERNATIONAL COOPERATION

Specifically, our continued efforts must focus on international cooperation in two essential areas - precision, navigation, and timing and situational awareness. Several countries are developing potentially competitive systems to the United States' Global Positioning System, although only the fielded Russian system has any significant operational capability. The Russian GLONASS system, the proposed European Space Agency Galileo global navigation satellite system, and the Chinese planned Beidou regional navigation and Compass global navigation systems. Based on this, Russia, China, and the European Union should be our first strategic partners. Encouraging international use of our Global Positioning System, rather than individual nations maintaining their own navigation capability, may help minimize the likelihood of attacks due to negative international impacts.[34] To do this, the United States must emphasize the robust, dependable capability of our global system for worldwide use and avert the development of too many international competitive systems.

Within the area of situational awareness, the United States has become the global deconfliction coordinator due to our capacity to monitor and track a significant amount of space objects. We have the ability to manage a massive space catalogue of all assets we can detect in space; however, we are still limited in our capabilities to detect everything. Situational awareness cooperation opens avenues to engage diplomacy and in the end, reduce the threat by removing a great deal of secrecy behind United States perceived motives. It should be obvious that as more and more nations launch objects into space, the more congested the environment will be, and the more important collision avoidance will become. Then, deconfliction coordination and shared data through international partnerships will become even more critical.

It may seem like we are giving away the technology that we as a country have worked so hard to achieve. In some cases we may be. However, in the end, the sharing of the technology it is a small price to pay for an overall decrease in the operating environment threats and greater assurance that the system is unlikely to be targeted.

INTERNATIONAL RULES FOR SPACE OPERATIONS

Just as when we were children playing in the sandbox, there were rules to follow. There is no reason the domain of space should not be treated the same. The idea of "space domination" must end. No one likes the "bully" in the sandbox. The United States must be the biggest advocate for this change through both our words and our actions. Yes, if you have control of the air above a country, you also have a dominant force over that territory. However, this does not translate to space. A country does not "own" the space above their land, and it is impossible to dominate the vast domain.

The United States must take the lead and sponsor talks for establishing an international rule set / behavior set for space faring nations, with a focus on the collaborative and cooperative use of space. An internationally derived and agreed upon rule set establishes the baseline parameters for cooperative activities in space. It will also help limit excessive and unnecessary spending on space control capabilities by countries that may feel threatened. The Stimson Center's Space Security Program developed a baseline "Model Code of Conduct for Responsible Space Faring Nations" that could serve as the starting point for international discussions on an agreed upon rule set in space.

While the international community cannot be forced to accept the document as written, it does provide a solid launching point for collaborative international discussions. Although the

individuals that developed this document were not serving in any official government capacity at the time, it was prepared as a collaborative effort between experts from non-government offices in several countries, to include Canada, France, Japan, Russia, and the United States.[35] The document emphasizes the critical importance of space for global economics, commercial advancements, scientific research, and international security and emphasizes the value in avoiding offensive operations in the space domain. [36] It recognizes the potential consequences harmful actions in space could have for international peace, security, and stability and encourages both international cooperation and legal methods to ensuring stability and peace.[37] (See appendix A for the proposed Code of Conduct document)

International sharing of the data will be critical to maximizing the world's utility of space and maintaining an internationally safe operating environment within the defined and agreed upon rule set. As more countries sign collaboration and international agreements for operating in space, the more enforcement will be necessary. This enforcement will be much easier with both an increase in situational awareness data as well as an international partnership for information sharing and management. In effect, the better space situational awareness the international community has, the less likely a nation is to challenge or intentionally dishonor these agreements.

PASSIVE SPACE PROTECTION TECHNOLOGIES

While the international cooperation backbone helps minimize the likelihood of an attack from a partner or peer nation, augmenting the cooperation framework with passive protection technologies helps mitigate threats from radical, non-state actors, or when international cooperation efforts fail. However, no space protection method is perfect. International

cooperation cannot completely prevent issues from developing, nor can technologies solve all the problems either.

The individual threats are too diverse and they change too rapidly to center a protection strategy on responding to new threats with active defenses. For example, altering anti-satellite missiles with new seekers, maneuverability, or range components takes less time than any space-based defense measures could be re-fielded. In general, space based defenses are too slow to field for all potential threats and should not be considered useful protection methods. It is also quite difficult, if not impossible, to incorporate additional on-board defensive capabilities once a satellite system is in orbit. Even the idea of active, off-board escort assets creates additional command and control requirements and potential fratricide to the current infrastructure. In addition, the very fast response timelines required for operation, need even faster and more robust autonomous control capabilities. Politically, this is unrealistic. Not to mention that the expense and lack of guaranteed success against an assortment of targets does not justify this as a viable protection solution.

Passive protection technologies, however, are those technologies that cannot be perceived as having any offensive or threatening characteristics. Several examples include jam-resistant communication and global positioning signals; automatic shutters for optical platforms; as well as, nuclear and space environment equipment hardening. The United States already employs many of these technologies today. All satellite electromagnetic components must be manufactured with advanced solar radiation protection coatings, ensuring adequate protection against the harsh space-operating environment. For example, each new Global Positioning System satellite has increased the anti-jamming protection and the newer military communication satellites have much more robust encryption than the original systems did. We

must launch our next generation systems with relevant passive protection devices automatically incorporated.

No matter what the specific technical solution, success requires consistent and adequate funding. Focusing our dedicated space control resources on passive defensive technologies and improved situational awareness is critical. Although the specific space control budget activities are not a major percentage of the Defense Department budget, this overall acquisition focus on passive protection requires funding from more than the space control budget line itself. Potential solutions may require funding adjustments within the programs themselves, and not only from a centralized space protection program element. Determining how the funding responsibilities are distributed falls on the acquisition community and ultimately is the responsibility of the individual programs.

Recently, the overall space budget has received a lot of attention from Congress. With many major space acquisition programs being over budget and potentially reaching the point of a Nunn-McCurdy breach, Congress has taken major steps to warn the US space acquisition community that it must make the tough decisions and clean up their acquisition efforts. Specifically, Congress targeted the Space Radar and the Transformational Satellite Communications programs to set the example.[38] While these may not be space protection programs specifically, they are an indication that the seemingly unlimited resources in space are no longer available.

We can no longer afford to manage our space budgets the same way as we have in the past. Senator Wayne Allard (R-CO), stated, "I strongly believe that continued mismanagement of our space acquisition programs is a far greater threat to our space dominance than any external danger."[39] While Sen. Allard has always supported advancements in space technologies and

capabilities, he does have an interesting point with his statement. Today's leadership must establish and maintain consistent funding priorities. We cannot afford to spend millions of dollars year after year on new technology, when we could more efficiently use diplomacy.

Our space acquisition process must incorporate and prioritize capability protection and adequately fund it. This means the Program Managers and Program Executive Officers must justify to the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)), if they propose trading away protection devices for enhanced system capability during tight budget years. Acquisition leaders must make the hard choices and decide what is truly important, and what may be "technology for technology sake." This requires the strength to make these difficult decisions and the ability to uphold the earlier imperative for a dramatic change in our military space culture.

COUNTER ARGUMENT - WEAPONIZING SPACE

Space weaponization advocates believe that weaponization has already occurred and the United States is behind the power curve. They claim we must quickly step up our efforts in space control and develop both offensive and defensive weapons to protect and defend our national interests/assets. Alternatively, there are those that believe space weaponization has not happened yet, but that it is inevitable. They see it as a strategic opportunity for the United States. This concept has been coined "Astropolitik."[40] Dr. Everett Dolman, Professor of Comparative Military Studies at the United States Air Force's School of Advanced Air and Space Studies, defines the theory that the battlefield in space is just an extension of how the battlefield has grown on the earth. "US [United States] astropolitical thinkers see space as a territory to be conquered and mastered."[41] While the medium of space may be seen as the "ultimate frontier,"

must we "conquer" it in the same aggressive manner that we have approached the sea, land, and air domains?

> Astropolitik recommends a very aggressive approach to "protecting" the space arena.
>
> "The United States should endeavor, at once, to seize military control of low-Earth orbit. From that high ground vantage, …space-based laser or kinetic energy weapons could prevent any other state from deploying assets there, and could most effectively engage and destroy terrestrial enemy ASAT facilities. Other states should still be able to enter space relatively freely for the purpose of engaging in commerce, in keeping with the principles of the new regime."[42]

This statement claims the United States has determined what is right and wrong and has chosen a very adversarial stance against all other nations. Do we really want to pick a fight with the world? Does "might make right?" The National Security Policy of 2006 does emphasize the need for a full freedom of action in space, as well as the freedom to deny the adversary's use of space if it supports US national interests. [43] I argue that an aggressive approach in space will lead to a war of attrition within the domain and the eventual loss of all national space capabilities as well as our international standing.

WHY WEAPONIZATION SPACE WON'T WORK --- EXAMPLE: CHINA

Proponents of space weaponizing argue that China, for example, is rapidly growing both economically and militarily. With this growth comes a rise in their worldwide political status and possibly an attempt at establishing a regional hegemony in Asia. However, this view is looking at China through a Western lens. Observing and understanding China leads one to a very different conclusion. Space weaponization proponents are preparing for an eventual conflict between the United States and China and yet, they have not followed two simple rules of their perceived enemy. Sun Tzu said, "Know the enemy and know yourself; in a hundred battles you

will never be in peril" and "Determine the enemy's plans and you will know which strategy will be successful and which will not."[44]

The Chinese are a very patient culture emphasizing a much different focus than the West. Where western culture places value on the future, for motivation, the Chinese emphasize the past. Their strength comes from observation and reflection of the past, for they feel that there is nothing to learn yet from the future. Those who have emphasized the "inevitable space-conflict" that will arise between China and the US have overstated the threat.[45] The Chinese saw what happened when the United States and Soviet Union competed in direct arms competition. The United States won and the Soviet economy collapsed. China will not make the same mistake the Soviets did during the Cold War and get into a direct arms competition with the United States.

China focuses its ambition on both regional and world recognition. They want a place at the table with a "big chair". They do not want to sit in the gallery as an observer of world politics. Just as the United States wishes to have global influence, so does China. To do this, the Chinese feel they must achieve certain milestones to prove their fortitude and strength. This includes, but is certainly not limited to, a demonstration of their capabilities in space. However, just because China has the ability to execute an anti-satellite weapon test (as was demonstrated in January 2007), it does not mean they will operationally launch one against an adversary.

Even in a Taiwan scenario, China's use of an anti-satellite weapon would be more detrimental to them, than any perceived benefit from the strike. The United States retaliation power in its air, ground, and sea forces far outweigh the short-term tactical advantage China might gain from the destruction of a United States satellite. Not to mention the international uprising from just creating massive amounts of orbital debris that would result from such a strike.

China and the United States also remain tied economically. China has moved from an isolated, communist-centric society, into the global community. "Red China and capitalist American are now joined at the hip in the economic sphere is a fact that few politicians care to acknowledge fully."[46] China needs the United States consumers and the United States needs China's financial backing to support its growing national debt.[47] Even though the most recent disagreements between the United States and China on the United States decision to go forward with the $6B arms package to Taiwan has caused a negative reaction from China, this is not new, nor are the arms sales large enough to force an international conflict between the two countries.[48] Beijing's reaction this time is no different than it has been in the past and dialogue on other international issues has not been hampered.[49] Again, this is an example of China using their information instrument of power to demonstrate their strength on the international stage. They are not using, or threatening, to use their military force.

We need China's support and cooperation in fighting our most critical adversary of the day, terrorism. Our main threat "is not going to be from state sponsored attacks on our space assets, but rather intermittent terrorism generated by states or sub-state actors."[50] To fight terrorism, the United States needs more than just its own resources. This fight requires many things, but it especially international cooperation with major world powers like China. Yes, combating terrorism also requires sophisticated space capabilities, and therefore a certain level of protection from the rogue, non-state actor jamming capabilities, but ending terrorism certainly does not require sophisticated space-based weapons.

While I am not so arrogant to believe that a purely collaborative world will exist within the space domain. Nothing is purely that black and white, nor politically that simple. However, an aggressive stance towards weaponizing space is absolutely the wrong approach. The United

States must take the initiative and lead the international community in building a collaborative space environment. Even by closer examination of Dr. Dolman's Astropolitik, the idea of this collaborative, less competitive environment is not a foreign concept. "The US [United States] can take the initiative in space, and it should. In the vast ocean of space, we have more in common with each other – no matter how culturally or socially apart … It seems further obvious that the maximum long-term benefit to be gained from the rights of space will ultimately come as a result of a globally cooperative effort."[51] So by this statement, even the opposition sees the benefits of a collaborative international partnership in space. Now we just need the national commitment and strength to take this international, strategic leap forward.

CONCLUSION

"You must be the change you want to see in the world." ~ Mahatma Ghandi

The United States must make several radical changes from its historical problem solving methodologies and develop a national space protection strategy built upon and strengthened by cooperation, not technology. Difficult choices must be made both internally, with the acquisition focus on passive protection technologies, and internationally, by establishing a unified code of conduct for nations in space. Through it all, the focus must remain on building ourselves as a benevolent hegemon, not the bully.

We must have patience and remain consistent in our approach over the long term. Altering the American and specifically the United States Air Force historical culture will be challenging. Dr Krepon's testimony to the House Armed Services Committee in March 2009 articulates this perfectly. "The timing is right for Washington, Beijing, and Moscow to

reconsider their approach to ASAT [ant-satellite] tests and space superiority. The United States has more agenda-setting power than any other country, but no single nation can create conditions for successful space diplomacy. The US [United States], China and Russia have many competitive pursuits, but we all need to utilize space. The challenge facing major space-faring nations is how to align their space diplomacy with their common interests."[52]

Our nation is at a decisive point in our space history. Either we can remain a leader in the world, or we can let the world lead us. The United States must take the moral high ground and foster a cooperative international space community. Through both our rhetoric and our actions, we must demonstrate a true commitment to keeping space open for all to use rather than relying on force to dominate the arena and cause unnecessary economic, political, and military escalations. If we set the example and avoid confrontation in space, the world may just follow our lead.

APPENDIX A

Model Code of Conduct for Responsible Space-Faring Nations

Released by the Stimson Center October 24, 2007

Central Objective of this Code of Conduct:

To preserve and advance the peaceful exploration and use of outer space.

Preamble:

We the undersigned;

Recognizing the common interest of all humankind in achieving progress in the exploration and use of outer space for peaceful purposes;

Reaffirming the crucial importance of outer space for global economic progress, commercial advancement, scientific research, sustainable development, as well as national, regional and international security;

Desiring to prevent conflict in outer space;

Reaffirming our commitment to the United Nations Charter;

Taking into consideration the salience of Article 2(4) of the Charter, which obliges all members to refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the purposes of the United Nations;

Taking special account of Article 42 of the Charter, under which the United Nations Security Council may mandate action by air, sea, or land forces as may be necessary to maintain or restore international peace and security;

Recognizing the inherent right of self-defense of all states under Article 51 of the Charter;

Reinforcing the principles of the Outer Space Treaty of 1967, including:

- the exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries,

- outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law,
- outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means, in the exploration and use of outer space, States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space with due regard to the corresponding interests of all other States Parties to the Treaty;
- State Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying weapons of mass destruction;
- the moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes.

Recalling the importance of space assets for non-proliferation, disarmament and arms control treaties, conventions and regimes;

Recognizing that harmful actions against space objects would have injurious consequences for international peace, security and stability;

Encouraging signature, ratification, accession, and adherence to all legal instruments governing outer space, including:

1967 Outer Space Treaty
1968 Rescue Agreement
1972 Liability Convention
1976 Registration Convention
1984 Moon Agreement

Recognizing the value of mechanisms currently in place related to outer space, including the 1994 Constitution of International Telecommunications Union; the 1963 Partial Test Ban Treaty; the 1988 Intermediate-Range Nuclear Forces Treaty; the 1994 Strategic Arms Reduction Treaty; and the 2003 Treaty on Strategic Offensive Reductions.

Recognizing the dangers posed by space debris for safe space operations and recognizing the importance of the 2007 Space Debris Mitigation Guidelines of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space;

Recognizing the importance of a space traffic management system to assist in the safe and orderly operation of outer space activities;

Believing that universal adherence to this Code of Conduct does not in any way diminish the need for additional international legal instruments that preserve, advance and guarantee the exploration and use of outer space for peaceful purposes;

Declare the following rights and responsibilities:

Rights of Space-Faring States:

1. The right of access to space for exploration or other peaceful purposes.
2. The right of safe and interference-free space operations, including military support functions.
3. The right of self-defense as enumerated in the Charter of the United Nations.
4. The right to be informed on matters pertaining to the objectives and purposes of this Code of Conduct.
5. The right of consultation on matters of concern and the proper implementation of this Code of Conduct.

Responsibilities of Space-Faring States:

1. The responsibility to respect the rights of other space-faring states and legitimate stakeholders.
2. The responsibility to regulate stakeholders that operate within their territory or that use their space launch services in conformity with the objectives and purposes of this Code of Conduct.
3. Each state has the responsibility to regulate the behavior of its nationals in conformity with the objectives and purposes of this Code of Conduct, wherever those actions occur.
4. The responsibility to develop and abide by rules of safe space operation and traffic management.
5. The responsibility to share information related to safe space operations and traffic management and to enhance cooperation on space situational awareness.
6. The responsibility to mitigate and minimize space debris in accordance with the best practices established by the international community in such agreements as the Inter-Agency Debris Coordination Committee guidelines and guidelines of the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space.
7. The responsibility to refrain from harmful interference against space objects.
8. The responsibility to consult with other space-faring states regarding activities of concern in space and to enhance cooperation to advance the objectives and purposes of this Code of Conduct.
9. The responsibility to establish consultative procedures to address and resolve questions relating to compliance with this Code of Conduct, and to agree upon such additional measures as may be necessary to improve the viability and effectiveness of this Code of Conduct.

The Model Code of Conduct was completed by experts from NGOs in Canada, France, Japan, Russia and the United States in October 2007. The group included Setsuko Aoki of Keio University, Alexei Arbatov of the Carnegie Moscow Center, Vladimir Dvorkin of the Center for Policy Studies in Russia, Trevor Findlay of the Canadian Centre for Treaty Compliance, Katsuhisa Furukawa of the Japan Science and Technology Agency, Scott Lofquist-Morgan of the Canadian Centre for Treaty Compliance, Laurence Nardon of the French Institute of International Relations, and Sergei Oznobistchev of the Institute of

Strategic Studies and Analysis. NGO participants worked on this project in a personal capacity. Their support for the model Code of Conduct therefore does not reflect endorsements by their institutions or governments

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[1] Lambakis, On the Edge of Earth, 110.
[2] Ibid.
[3] Webb, "Space Weapons," 31.
[4] Watts, "Doctrine, Technology and War," 20.
[5] Baker, "Developments and Lessons before World War II," 1.
[6] Hughes, *Overlord*, 133.
[7] Davis, Carl A. Spaatz and the Air War in Europe, 296-298.
[8] Hughes, Rescuing Prometheus, 105.
[9] Hughes, Rescuing Prometheus,69.
[10] Builder, *The Masks of War*, 68.
[11] Lambakis, *On the Edge of Earth*, 109-110
[12] AU-18 Space Primer. Chapter 21.
[13] Hoy, "Joint Space Operations Center: DoD's eye in the sky supporting troops on the ground."
[14] Note: At that time (Aug 2004) the USAF used "counterspace" to define offensive/defensive space operations where the joint community used the word "space control."
[15] Air Force Doctrine Document 2-2.1, Counterspace Operations, 1.
[16] Webb, "Space Weapons," 28.
[17] Webb, "Space Weapons," 28.
[18] Webb, "Space Weapons," 29.
[19] Webb, "Space Weapons," 29.
[20] Globe Newswire. "Integral Systems Completes Major Milestone to Provide US Air Force Greater Counterspace Capabilities."
[21] Secure World Foundation. XSS-11 Fact Sheet and RAIDRS Fact Sheet.
[22] Hardy, "AFRL Advanced Space Technologies," 16, 19.
[23] Adang, "Creating an Agile, All-Space Architecture," 6-11.
[24] Webb, "Space Weapons," 29.
[25] Krepon. "Testimony before the House Committee on Armed Services, Subcommittee on Strategic Forces, Space Security".
[26] China Culture.org. "When the snipe and the clam grapple." From the story comes the idiom Yù Bàng Xiāng Zhēng. It tells us that the third party will have an advantage fall into his lap when the other two parties are locked in combat for their own personal interests.
[27] Tirpak, "Future Global Force," 22.
[28] "U.S. space protection strategy emphasizes cooperation," C4ISR Journal, October 02, 2008.
[29] Kehler, Memorandum, Subject: Establishment of the Space Protection Program, 31 March 2008.
[30] Large, "National Security Space Collaboration as a National Defense Imperative," 4.
[31] "U.S. space protection strategy emphasizes cooperation," C4ISR Journal, October 02, 2008.
[32] Ibid.
[33] Ibid.
[34] Ibid.
[35] Krepon. "Testimony before the House Committee on Armed Services, Subcommittee on Strategic Forces, Space Security – Model Code of Conduct."
[36] Ibid.
[37] Ibid.
[38] Hitchens, "US Space Weapons," 48.
[39] Allard, "The Greatest Threat to US Space Dominance," 4A.
[40] Dolman, *Astropolitik*, 1.
[41] Grondin, "The (power) Politics of Space, The US Astropolitical Discourse of Global Dominance in the War on Terror." 115.
[42] Dolman, *Astropolitik*, 157.

[43] The White House. "The National Security Strategy March 2006."
[44] Tzu, The *Art of War*, 84, 100.
[45] Moore. "A New Cold War?" 180.
[46] Moore. "A New Cold War?" 181.
[47] Ibid.
[48] Gollust, "US Regrets Chinese Reaction to Taiwan Arms Sale."
[49] Ibid.
[50] Moore. "A New Cold War?" 185.
[51] Dolman, *Astropolitik*, 181-182.
[52] Krepon. "Testimony before the House Committee on Armed Services, Subcommittee on Strategic Forces, Space Security".

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